Amendments to the Claims:

This listing of claims will replace all prior version, and listings, of claims in the application.

Listing of Claims:

1 (currently amended) A method for obtaining an optimal reflectivity value for complex multilayer stacks, comprising:

(a) generating a model of a simulated multilayer stack prior to production of the multilayer stack and parameterizing each layer by a thickness and an index of refraction;

(b) allowing a user to input values for the parameters and to designate a plurality of the parameters as independent variables;

(c) calculating an extrema for a cost function of reflectivity *R* using the input parameter values;

(d) calculating sensitivity values *S* for the extrema ; and

(e) obtaining the optimal reflectivity value for the simulated multilayer stack by calculating a cost function $R + S$ using the plurality of independent variables at once.

2 (currently amended) The method of claim 1 wherein the obtaining ~~step~~ (e) further comprises~~includes the step of~~: calculating the cost function as $R + \alpha \cdot S$, where α is a weighted parameter.

3 (currently amended) The method of claim 1 wherein the generating ~~step~~ (a) further comprises~~includes the step of~~: providing the simulated multilayer stack with N layers, where a top layer comprises a top ambient resist layer followed by one or more layers of materials that are patterned over a substrate layer.

4 (currently amended) The method of claim 2 wherein the generating ~~step~~ (a) further comprises~~includes the step of~~: providing the index of refraction to include a real and an imaginary number.

5 (currently amended) The method of claim 4 wherein ~~step~~ the generating (a) further comprises~~includes the step of~~: providing a j^{th} layer with thickness d_j, and a complex index of refraction $\mathbf{n}_j = n_j - i\,k_j$.

6 (currently amended) The method of claim 5 wherein the generating~~step~~ (a) further comprises~~includes the step of~~: providing the ambient and substrate with complex indexes of refraction: $\mathbf{n}_0 = n_0 - i\,k_0$ and $\mathbf{n}_{N+1} = n_{N+1} - i\,k_{N+1}$, respectively.

7 (currently amended) The method of claim 6 wherein the generating~~step~~ (a) further comprises~~includes the step of~~: defining reflectivity at an interface between two layers as a cost function, wherein the reflectivity R_j at a j^{th} interface (between the $(j-1)^{th}$ and j^{th} layers) is a function of $3(N - j + 1) + 4$ parameters, which are ; $n_{j-1}, n_j \ldots n_N, n_{N+1}; k_{j-1}, k_j \ldots k_N, k_{N+1}; d_j, d_{j+1} \ldots d_N$.

8 (currently amended) The method of claim 1 wherein the allowing~~step~~ (b) further comprises~~includes the step of~~: allowing the user to enter values for the thickness and the complex indexes of refraction (n and k) for each layer, including a current starting point, a minimum value, and a maximum value for the thickness and the complex indexes of refraction for each layer.

9 (currently amended) The method of claim 8 wherein the allowing~~step~~ (b) further ~~includes the step of~~comprises: allowing the user to enter step values for the parameters

designated as independent variables, wherein those parameters that are not designated as independent variables are fixed.

10 (currently amended) The method of claim 1 wherein the obtainingstep (e) further comprisesincludes the step of: defining the sensitivity as $S = (\text{Max } R - \text{Min } R)$ for all varied parameters.

11 (currently amended) A computer-readable medium containing program instructions for obtaining an optimal reflectivity value for complex multilayer stacks, the instructions for:

(a) generating a model of a simulated multilayer stack prior to production of the multilayer stack and parameterizing each layer by a thickness and an index of refraction;

(b) allowing a user to input values for the parameters and to designate a plurality of parameters as independent variables;

(c) calculating an extrema for a cost function of reflectivity R using the input parameter values;

(d) calculating sensitivity values S for the extrema ; and

(e) obtaining the optimal reflectivity value for the simulated multilayer stack by calculating a cost function $R + S$ using the plurality of independent variables at once.

12 (currently amended) The computer-readable medium of claim 11 wherein instruction (e) further includes comprisesthe instruction of: calculating the cost function as $R + \alpha \cdot S$, where α is a weighted parameter.

13 (currently amended) The computer-readable medium of claim 11 wherein instruction (a) further includes comprises the instruction of: providing the multilayer stack with N

layers, where a top layer comprises a top ambient resist layer followed by one or more layers of materials that are patterned over a substrate layer.

14 (currently amended) The computer-readable medium of claim 13 wherein instruction (a) further ~~includes~~ comprises~~the instruction of~~: providing the index of refraction to include a real and an imaginary number.

15 (currently amended) The computer-readable medium of claim 14 wherein instruction (a) further comprises ~~includes the instruction of~~: providing a j^{th} layer with thickness d_j, and a complex index of refraction $\mathbf{n}_j = n_j - i\,k_j$.

16 (currently amended) The computer-readable medium of claim 15 wherein instruction (a) further comprises~~includes the instruction of~~: providing the ambient and substrate with complex indexes of refraction: $\mathbf{n}_0 = n_0 - i\,k_0$ and $\mathbf{n}_{N+1} = n_{N+1} - i\,k_{N+1}$, respectively.

17 (currently amended) The computer-readable medium of claim 16 wherein instruction (a) further ~~includes~~ comprises ~~the instruction of~~: defining reflectivity at an interface between two layers as a cost function, wherein the reflectivity R_j at a j^{th} interface (between the $(j-1)^{th}$ and j^{th} layers) is a function of $3(N-j+1)+4$ parameters, which are ; n_{j-1}, $n_j \ldots n_N$, n_{N+1}; k_{j-1}, $k_j \ldots k_N$, k_{N+1}; d_j, $d_{j+1} \ldots d_N$.

18 (currently amended) The computer-readable medium of claim 11 wherein instruction (b) further comprises~~includes the instruction of~~: allowing the user to enter values for the thickness and the complex indexes of refraction (n and k) for each layer, including a current starting point, a minimum value, and a maximum value for the thickness and the complex indexes of refraction for each layer.

19 (currently amended) The computer-readable medium of claim 18 wherein instruction (b) further comprises~~includes the instruction of~~: allowing the user to enter step values for the parameters designated as independent variables, wherein those parameters that are not designated as independent variables are fixed.

20 (currently amended) The computer-readable medium of claim 11 wherein instruction (e) further comprises~~includes the instruction of~~: defining the sensitivity as S = (Max R – Min R) for all varied parameters.